

HVAC SPECIFICATIONS

REQUIREMENTS

All materials and work shall be free from defects in workmanship and materials for a period of one (1) year from date of final acceptance and shall meet all local and state codes. All defects, which develop or are discovered within this period shall be repaired by the Contractor to the satisfaction of the Engineer and at no additional cost.

GENERAL

1. The Contractor shall examine the site of the proposed work to determine the existing conditions that may affect his work.
2. It is the intention of the Contract Drawings and Specifications to call for finished work, tested and ready for operation. All materials shall be new and of first-quality.
3. All material, work, incidental accessories or other details not shown but necessary to make the work complete and perfect, and in all respects ready for operation, even if not particularly specified, shall be provided by the Contractor at no additional cost.
4. The Contract Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of ductwork, pouches, and induction units. Existing ducts, pipes, utilities, etc. that are damaged during the construction period, whether or not due to the Contractor's negligence, shall be repaired or replaced by the Contractor and left in a condition satisfactory to the Engineer.
5. Coordinate locations of all pouches with architectural reflected ceiling plans.
6. The space around pipes, ducts, etc. penetrating rated walls, shall not exceed 1/2" and shall be packed solid with Thermafiber, Mineral Wool or equivalent non combustible material. Perimeter shall be closed off by tight fitting metal escutcheons on both sides of this construction as required by Sections C26-504.5 (b) of N.Y.C. Building Code.

MATERIALS TO BE RETURNED TO THE AUTHORITY

1. The Contractor shall deliver all excess material as shown below to a designated area in the W.T.C. complex as directed by the Engineer.
 - a. Light fixture air pouches
 - b. Round flexible duct for air connection to pouch

DUCTWORK

1. All ductwork shall be furnished, installed and fabricated in accordance with the latest edition of the SMACNA Low and High Velocity Duct Construction Standards Manual, using prime sheets of galvanized steel. All square elbows shall be provided with turning vanes on maximum 4" centers. Provide access doors at all fire and automatic dampers for access.
2. All branches and take-offs shall be equipped with volume controllers.
3. All finger ducts and flexible connectors shall be 7" diameter unless otherwise indicated on drawing.
4. Support horizontal ducts with hangers secured to structural steel above at intervals not exceeding 6'0". Install additional steel as required.
5. Flexible connectors to the supply duct and the diffuser plenum of ceiling pouches shall be sealed with 3M Co. 800 sealant and clamped with Stainless Steel Ideal Type 52 clamps.
6. All access doors shall be as per latest SMACNA Standards.
7. Remove existing 4" round flexible duct connection that penetrates the 2 hr. rated closure panel within the induction unit cover. Install new 4", 26 gauge galvanized steel circular duct, seal all joints with 3M Co. 800 sealant and stainless steel adjustable type clamps. A maximum length of 4'-0" of flexible ductwork shall be used for connection to the induction units.

FIRE DAMPERS

Fire dampers are based on Air Balance, Model #119 Type AL. They shall be installed in accordance with the manufacturer's approved installation instructions and shall be N.Y.C. Board of Standards and Appeals (B.S.A.), Underwriters Laboratories (U.L.) approved and labeled.

ACOUSTICAL DUCT LINER FOR INTERIOR DUCT SURFACES

1. Application
Acoustical duct liner shall be installed on the interior surface of the ductwork from the discharge connection of the HVAC equipment for a minimum distance of 10 feet.
2. Material
 - a) One inch thick rigid fiber glass duct liner board.
 - b) Insulation, including adhesive, shall have a composite fire and smoke hazard rating as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding a "Flame Spread" of 25 and a "Smoke Developed" of 50. Johns-Manville "Lincoustic FR" or approved equal.
 - c) Insulation shall have a density of 1.5 lbs. per cubic foot with a thermal conductivity of K=0.26 BTU/ft-hr-F/in at 75 F mean temperature.
 - d) The duct liner shall have a NRC of no less than 0.70 based on No. 6 mounting. (Test Method C423) and suitable for air velocities up to 2000 FPM.
3. Installation
 - a) Apply duct liner to duct surfaces with 100% coverage and approved adhesive.
 - b) The black surface of the liner shall face the air stream. All joints shall be snug and neatly butted.
 - c) All exposed edges and joints shall be heavily coated with approved adhesive. A metal nosing shall be installed on all leading edges of the liner.
 - d) On ductwork over 12" in width and/or sizes over 16" in height, additional mechanical fasteners on a maximum of 18" O.C. shall be used to fasten the duct liner to the duct. Fasteners shall be installed within 3" of the leading edges of all cross joints. All mechanical fasteners shall be flush with liner surface.

FLEXIBLE DUCT CONNECTORS

Flexible duct connectors for ductwork shall be made of an approved flame retardant fabric having a flame spread rating of not over 25 and a smoke development rating of not over 50 and shall not exceed 10 in. in length.

INDUCTION UNITS

1. Support and fasten units to prevent all vibration, providing all required wall brackets supporting legs and leveling devices. Units support method shall be subject to the approval of the Engineer and be similar to the method used for the existing units.
2. The Contractor shall adjust induction unit performance as shown on the contract drawings.
3. The air connection to the induction units shall be made with "Thermolux" Type S-TL as manufactured by Automated Industries or approved equal, of sizes shown, but not less than the full unit inlet size. The connections shall be sealed with Minnesota Mining & Mfg. Co. 800 sealant and clamped with Ideal Type 52 hose clamps, or approved equal. Flexible connections that penetrate any rated closures shall be installed as specified.
4. Contractor shall thoroughly clean all existing induction units by means of wire brushing or steam cleaning fitted surfaces, removing all dust and debris from plenum chamber, cleaning nozzles and replacing filters. All induction units thermostats shall be thoroughly checked for proper operation and recalibrated where required, or replaced if not functional.

PIPING

All piping connecting to the induction unit shall be Copper ASTM B-88, soft (annealed) Type L and fittings shall be standard weight copper and solder type. All soldered joints shall be made with 95-5 Tin-Antimony Solder having a melting point greater than 450 Deg. F. All soldered joints shall be thoroughly cleaned before the application of the solder. All insulation shall match existing.

VIBRATION ELIMINATORS

Vibration Hangers shall be HDA- GREEN (4 Req'd.) as manufactured by Mason Industries or an approved equal.

CEILING EXHAUST FANS

The Contractor shall install a ceiling exhaust fans in the locations shown on the drawing. Fans shall be Greenheck Inc., 115 volts, 1 ph, 60 Hz or approved equal.
EF-1 - Model SP-117, 212 cfm at 0" S.P. wt. 15 lbs.
EF-2 - Model SP-165, 1607 cfm at 0" S.P. wt. 56 lbs.
EF-3 - Model SP-165, 1607 cfm at 0" S.P. wt. 56 lbs.
EF-4 - Model SP-117, 212 cfm at 0" S.P. wt. 15 lbs.

FAN SUPPORTING REQUIREMENTS

1. All supporting steel shall conform to ASTM Designation A-36.
2. All nuts must have lock washers.
3. Contractor shall field measure and verify existing conditions.

CEILING DIFFUSERS

- All finishes shall be baked white enamel.
1. Diffusers (Supply): shall match existing
 2. Damper: Provide dampers for all diffusers

WATER COOLED AIR CONDITIONING UNIT

1. Furnish and install a packaged air conditioning unit. Unit shall be complete with temperature control, compressor, evaporator coil, condenser water regulating valve and other system components required to provide proper air conditioning for the space designated on the Contract Drawings. Filter shall be Class I, UL listed; 45% efficiency.
2. AC Unit shall be furnished with the following accessories:
 - a) Condensate Pump
 - b) Disconnect Switch
 - c) Thermostat
 - d) Filter rack
3. Schedule

Unit No.	CFM	Blower Motor H.P.	Ext. S.P.	Auxiliary Total Cooling Cap. (Btu) 30 DE BT HR	Cooling Water GPM	Model	Total Weight	MEA #
AC-5	3000	1	.6	90000	17.0 Gpm	S08T008	350 lbs.	93-83-E
AC-6	1200	1/2	.3	36000	9.4 Gpm	HS038	225 lbs.	21-81-E
AC-7	675	1/8	.0	20200	3.8 Gpm	AL020WCPHO	227 lbs.	20-85
AC-8	675	1/8	.0	20200	3.8 Gpm	AL020WCPHO	227 lbs.	20-85

Unit No.	NAMEPLATE	VOLTAGE
AC-5	Carrier	480V, 3ø
AC-6	Climate Master	480V, 3ø
AC-7	Libbert	277V, 1ø
AC-8	Libbert	277V, 1ø

4. The Unit shall be factory run, tested and rated in accordance with ARI Standards.
5. AC Unit shall be complete with water regulating valve. Valve shall be Metrix WCCW type or an approved equal. It shall be a positive shut-off type and shall be rated for 150 psi. working pressure.
6. Unit shall be similar or equal to Carrier Inc. and rated at 150 lbs. working pressure.
7. Vibration pad shall be "Shear-Flex-Flex Plate" as manufactured by Vibration Mountings Control Inc. or an approved equal.

ESTIMATED SUPPLEMENTAL COOLING LOAD

The estimated supplemental cooling load for this Tenant Alteration Application is 13.8 Tons.

BIPOLAR IONIZATION FILTER

Furnish and install on AC unit a new Bi-Polar ionization filter 48" wide x 24" high x 30" deep as manufactured by BioClimatic Inc. of Mount Laurel, N.J..

PIPING AND ACCESSORIES

- A. TEST REQUIREMENTS (Aux. Cooling Water)
 - Operating Pressure 150 PSIG
 - Operating Temperature 85 Deg. F - 95 Deg. F
 - Hydrostatic Test Pressure 1.5 x Operating Pressure
 - Duration of Test 2 hours

Isolate equipment, controls, instruments and valves from the piping system during hydrostatic tests

B. Piping & Fittings System

	Pipe	Fittings
Aux. Cooling Water	Black Steel Pipe, Conforming to ASTM A-53 Schedule #40 Grade B, Black Seamless	2-1/2" cast iron screwed 250 lb. class 3" and larger shall be welded
A.C. Unit Condensate Drain	Copper ASTM B-88 Hard Temper Type (L)	Wrought Copper Solder Joint 5 ANSI B16.18
Domestic Water	Hard Temper Copper Type (TP)- ASTM B302	Cast Bronze for Brazing - ANSI B16.18

Vent auxiliary cooling water piping at all high points.

C. Accessories

1. Unions for auxiliary cooling water service shall be similar and equal to 250 lb. class, malleable iron with bronze seats, Grinnell Figure 554, U.L.
2. Nipples 6" length or less, shall be extra heavy and the material shall be the same as the pipe. Close nipples shall not be used.
3. Braided type flexible connector shall be Vibration Mounting and Control Inc., (VICO) Model MFP Style NE Max. 280 psig or approved equal.

D. Soldered Joints

95-5 Tin-Antimony Solder having a melting point greater than 450 F. Excess solder shall be removed while still in the molten state with a file left at the face of the fitting.

E. Thermometers

1. Thermometers for piping shall be of the "all angle" (universal), separate socket, industrial type with #304 stainless steel extension neck wells.
2. The thermometer for auxiliary cooling shall operate at 0 - 160 Deg. F range and shall include a sufficient safety margin at either end.
3. Thermometers shall be as manufactured by Albert A. Weiss, Wekster Instrument Co., Ashcroft or approved equal.

F. Pressure Gauges

1. Pressure gauges shall be of the bourdon tube spring type shall have black aluminum cases with black numbers on dial shall be as manufactured by Albert A. Weiss, Wekster Instrument Co. or approved equal.
2. The pressure range for the auxiliary cooling, shall be 0 - 150 psi. The pressure range for the domestic water, shall be 0 - 150 psi.

G. Strainers

Strainers shall be similar and equal to those manufactured by Grinnell Co. or approved equal. Screwed "Y" strainers for pipes 2-1/2" and smaller shall be stainless steel. Strainers shall be provided for all piping.

H. Cutting and Patching, Sleeves and Escutcheons

1. Pipe passing through walls shall have a trim opening installation of a sleeve secured therein. Sleeves shall be of the same material as the pipe or required insulation passing through flush with the finished wall surfaces. Sleeves shall be made of the same material as the pipe or required insulation passing through flush with the finished wall surfaces. Sleeves shall be made of the same material as the pipe or required insulation passing through flush with the finished wall surfaces.
2. Pipe passing through floor slabs shall have an opening not less than the outside diameter of the pipe or required insulation.
3. Annular spaces between piping and sleeves or core of wall shall be filled with thermalfiber and sealed to retain the fire integrity of the wall.
4. All piping passing through walls, floors or ceilings shall be protected with brass escutcheons with fastening set screws similar and equal to those manufactured by Grinnell Co. or approved equal.

I. Pipe Supports and Hangers

1. All supports and parts shall conform to the latest requirements of the MSS standard practice SP-58, or approved equal.
2. Hangers shall be manufactured by Grinnell Co., Centric Co. or an approved equal.
3. Pipe hangers, rods, inserts and clamps shall be those specified by the Underwriters' Laboratories, Inc.
4. Unless otherwise specifically approved, hanger size shall be as follows:

	Pipe Sizes	Max Hanger Spacing
steel	1/2" to 1"	7 ft. o.c.
	1-1/4" to 2"	9 ft. o.c.
	2-1/2" to 3-1/2"	10 ft. o.c.
	4" to 5"	12 ft. o.c.
copper	1/2" to 1-1/4"	6 ft. o.c.
	1-1/2" to 2"	8 ft. o.c.

J. Valves

Type	Size	Pressure	Jenkins Fig. No.	Crane Fig. No.
Gate	Up to 2"	125 psi.	47U	425-B
Gate	Up to 2"	150 psi.	49U	431
Gate	Up to 2"	300 psi.	280U	634E
Ball	Up to 3"	300 psi.	32A	930-T
Plug	4" & Up	300 psi.		

2. Balancing valves shall be non-lubricating eccentric plug stop valve shall be rated for 175 lb.W.O.G. or 400 lb. W.O. manufactured by DeZurik or approved equal.

3. Domestic Water

- (a) Gate Valves - Fairbanks Fig. 0250-FB
- (b) Check Valves - Fairbanks Fig. 0640-FB
- (c) Pressure Reducing Valves - J.R. Gunzenhauser, Mfg. Co.
- (d) Vacuum Breaker - Watts Regulator Co. Mod. No. 21

K. Pipe and Valve Identification

1. Provide and affix a set of approved adhesive bands identifying the piping and valves.
2. Each set shall consist of one band on which the name of the system, size, and pressure shall be indicated in letters not less than 1 inch high.
3. Bands shall be in colors as indicated below and shall be as follows:

System	Background	Letter
Auxiliary Cooled Water	Green	E

Adhesive bands shall be W.H. Brady Company, Seton Co. or approved equal. Place a durable metal or plexiglas tags permanently affixed to the piping and valves indicating the tenant name, floor served, and "SUPPLY" or "DRAIN" with black lettering on a green background.

L. Threaded Joints
Steel pipe threaded joints shall be made tight using only pipe dope or tape, placed on the male thread only.

INSULATION FOR CONDENSATE WATER

Insulation: 1/2" thick one piece fiberglass, flame spread rating "50". (insulate valves and fittings.)

AUXILIARY DRAIN PAN REQUIREMENTS

1. Make drain pan 12" Larger than AC units on all four sides 1/2" hem turned down outside of pan. Pans shall be made of galvanized steel with soldered corners made water tight.
2. Install water sensor in drain pan along with necessary connections to shut down AC unit when activated by water in the pan.
3. Water alarms shall be "Water Alert" Made By Dorfen, sensor indicator unit model no. RA-2(T), power supply unit model RA-2(T) so that they can be easily heard in the occupied space.
4. Place a durable metal sign permanently affixed to alarm unit. When Alarm sounds call 433-4164 weekdays and weekends.

PIPE WELDS

All welding shall be done in accordance with applicable provisions of the ASME B31.1.

EXECUTION

1. All work in occupied tenant areas shall be performed on as directed by the Engineer.
2. The Contractor shall notify the Engineer when shut-down necessary. Shut-down time shall be kept to a minimum.